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SOLAR/1030-79/03

Monthly Performance Report

CHESTER WEST

MARCH 1979

FEB 14 1980

U.S. Department of Energy

National Solar Heating and Cooling Demonstration Program

National Solar Data Program

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MONTHLY PERFORMANCE REPORT

CHESTER WEST

MARCH 1979

I. SYSTEM DESCRIPTION

The Chester West site is a single-family residence in Huntsville, Alabama. Solar energy is used for space heating the home and preheating domestic hot water (DHW). The solar energy system has an array of flat-plate collectors with a gross area of 225 square feet. The array faces south at an angle of 49 degrees to the horizontal. A glycerol-water solution is used as the medium for delivering solar energy from the collector array to storage; water is the medium for delivering solar energy from storage to the space heating and hot water loads. Solar energy is stored aboveground in a 500-gallon water storage tank. Auxiliary space heating is provided by an air-to-air heat pump and electrical heating elements which are designed to function in parallel with the solar energy space heating loop. Auxiliary hot water heating is provided in series with the solar energy hot water heating loop through the use of electrical heating elements in an 80-gallon DHW tank. The system, shown schematically in Figure 1, has three modes of solar operation.

Mode 1 - Collector-to-Storage: This mode activates when the control system senses a sufficient temperature difference between the collector and storage and remains active until the temperature difference drops below the accepted minimum. The collected energy is transferred to storage through a ring-type, liquid-to-liquid heat exchanger located in the storage tank. Pump P1 is operating.

Mode 2 - Storage-to-Space Heating: This mode activates when there is a demand for space heating. Solar energy is circulated to the conditioned space by solar-heated water from storage through a liquid-to-air heat exchanger located in the air-distribution duct. Pump P3 is operating.

Mode 3 - Storage-to-DHW Tank: This mode activates when the control system senses a sufficient temperature difference between storage and the DHW tank, and remains active as long as a sufficient temperature difference exists. Water circulates from the top of storage through a liquid-to-liquid heat exchanger located in the bottom of the DHW tank. Pump P2 is operating.

II. PERFORMANCE EVALUATION

INTRODUCTION

The site was occupied during the month of March; however, the solar energy system was not completely operational during the month. The DHW subsystem was

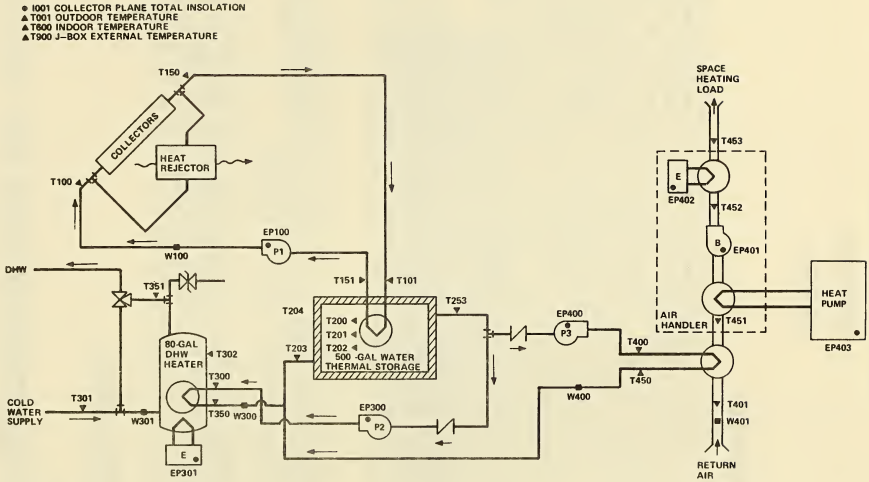

Figure 1. CHESTER WEST SOLAR ENERGY SYSTEM SCHEMATIC

turned off from March 7 through March 26. A new storage tank was installed on March 1. A malfunctioning liquid flowmeter in the DHW loop rendered some of the DHW and storage performance factors invalid. The liquid flowmeter in the space heating loop also malfunctioned; however, it was possible to analyze all space heating performance factors by using air rather than liquid flow. Data on the space heating component indicated a solar fraction of 33 percent, and an electrical energy savings of 0.33 million Btu.

WEATHER CONDITIONS

During the month, total incident solar energy on the collector array was 9.5 million Btu for a daily average of 1356 Btu per square foot. This was about the same as the estimated average daily solar radiation for this geographical area during March of 1347 Btu per square foot for a south-facing plane with a tilt of 49 degrees to the horizontal. The average ambient temperature during March was 54°F as compared with the long-term average for March of 51°F. The number of heating degree-days for the month (based on a 65°F reference) was 330, as compared with the long-term average of 461. The number of cooling degree-days was 16, as compared with the average of 21.

THERMAL PERFORMANCE

Collector - The total incident solar radiation on the collector array for the month of March was 9.5 million Btu. During the period the collector loop was operating the total insolation amounted to 8.2 million Btu. The total collected solar energy for the month of March was 3.7 million Btu, resulting in a collector array efficiency of 40 percent, based on total incident insolation. There were two instances when the collector loop malfunctioned: 1) It turned on on March 9, but stayed on continuously until it turned off on March 11; 2) it turned on on March 21, but ran continuously until midnight. There were some energy losses during these periods. Operating energy required by the collector loop was 0.40 million Btu.

Storage - The average storage temperature for the month was 127°F.

DHW Load - The DHW subsystem consumed an unknown amount of solar energy and 1.2 million Btu of auxiliary electrical energy to satisfy a hot water load of 1.1 million Btu. The DHW subsystem consumed a total of 0.087 million Btu of operating energy. A daily average of 62 gallons of DHW was consumed at an average temperature of 131°F delivered from the tank.

Space Heating Load - The space heating subsystem consumed 0.73 million Btu of solar energy and 1.3 million Btu of auxiliary electrical energy to satisfy a space heating load of 2.2 million Btu. The solar fraction of this load was 33 percent. The space heating subsystem consumed a total of 0.18 million Btu of operating energy, resulting in an electrical energy savings of 0.33 million Btu.

OBSERVATIONS

Unreliable liquid flowmeters limited the performance evaluation of this site. Both flowmeters became fouled with debris from the old storage tank and suffered a scum buildup attributed to the corrosive reaction of the metals and liquid in the system.

ENERGY SAVINGS

The space heating subsystem contributed an electrical energy savings of 0.33 million Btu.

III. ACTION STATUS

Boeing is investigating various approaches to solve the liquid flowmeter problem. The use of filters to purge the system of debris and the use of additives to impede corrosion are being considered.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: CHESTER WEST
REPORT PERIOD: MARCH,1979

SOLAR/1030-79/03

SITE/SYSTEM DESCRIPTION:
THE CHESTER WEST SITE IS A THREE-BEDROOM TWO-STORY SINGLE FAMILY DWELLING OF APPROXIMATELY 2300 SQUARE FEET OF LIVING AREA. THE SOLAR SYSTEM USES ROOF MOUNTED FLAT PLATE COLLECTORS. A MIXTURE OF ANTIFREEZE AND WATER SERVES AS THE COLLECTOR-TO-STORAGE HEAT TRANSPORT FLUID. HEAT STORAGE IS A 500 GALLON TANK OF WATER LOCATED IN THE GARAGE. THE SOLAR SYSTEM SERVICES DHW PREHEAT AND SPACE HEATING NEEDS OF THE DWELLING FROM STORAGE ONLY. AUXILIARY SPACE HEATING IS PROVIDED BY A HEAT PUMP AND RESISTANCE HEATING COMBINATION.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	9.461 MILLION BTU
	42049 BTU/SQ.FT.
COLLECTED SOLAR ENERGY	3.740 MILLION BTU
	16622 BTU/SQ.FT.
AVERAGE AMBIENT TEMPERATURE	54 DEGREES F
AVERAGE BUILDING TEMPERATURE	72 DEGREES F
ECSS SOLAR CONVERSION EFFICIENCY	*
ECSS OPERATING ENERGY	0.400 MILLION BTU
TOTAL SYSTEM OPERATING ENERGY	0.662 MILLION BTU
TOTAL ENERGY CONSUMED	6.866 MILLION BTU

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	1.108	2.201	N.A.	3.228 MILLION BTU
SOLAR FRACTION	*	33	N.A.	* PERCENT
SOLAR ENERGY USED	*	0.725	N.A.	* MILLION BTU
OPERATING ENERGY	0.087	0.176	N.A.	0.662 MILLION BTU
AUX. THERMAL ENERGY	1.151	1.223	N.A.	2.374 MILLION BTU
AUX. ELECTRIC FUEL	1.151	1.312	N.A.	2.463 MILLION BTU
AUX. FOSSIL FUEL	N.A.	N.A.	N.A.	N.A. MILLION BTU
ELECTRICAL SAVINGS	*	0.330	N.A.	* MILLION BTU
FOSSIL SAVINGS	N.A.	N.A.	N.A.	N.A. MILLION BTU

SYSTEM PERFORMANCE FACTOR: 0.310

* DENOTES UNAVAILABLE DATA
@ DENOTES NULL DATA
N.A. DENOTES NOT APPLICABLE DATA

REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SITE SUMMARY

SITE: CHESTER WEST
REPORT PERIOD: MARCH,1979

SOLAR/1030-79/03

SITE/SYSTEM DESCRIPTION:
THE CHESTER WEST SITE IS A THREE-BEDROOM TWO-STORY SINGLE FAMILY DWELLING OF APPROXIMATELY 2300 SQUARE FEET OF LIVING AREA. THE SOLAR SYSTEM USES ROOF MOUNTED FLAT PLATE COLLECTORS. A MIXTURE OF ANTIFREEZE AND WATER SERVES AS THE COLLECTOR-TO-STORAGE HEAT TRANSPORT FLUID. HEAT STORAGE IS A 500 GALLON TANK OF WATER LOCATED IN THE GARAGE. THE SOLAR SYSTEM SERVICES DHW PREHEAT AND SPACE HEATING NEEDS OF THE DWELLING FROM STORAGE ONLY. AUXILIARY SPACE HEATING IS PROVIDED BY A HEAT PUMP AND RESISTANCE HEATING COMBINATION.

GENERAL SITE DATA:

INCIDENT SOLAR ENERGY	9.981 GIGA JOULES 477512 KJ/SQ.M.
COLLECTED SOLAR ENERGY	3.946 GIGA JOULES 188761 KJ/SQ.M.
AVERAGE AMBIENT TEMPERATURE	12 DEGREES C
AVERAGE BUILDING TEMPERATURE	22 DEGREES C
ECSS SOLAR CONVERSION EFFICIENCY	N.A.
ECSS OPERATING ENERGY	0.422 GIGA JOULES
TOTAL SYSTEM OPERATING ENERGY	0.699 GIGA JOULES
TOTAL ENERGY CONSUMED	7.243 GIGA JOULES

SUBSYSTEM SUMMARY:

	HOT WATER	HEATING	COOLING	SYSTEM TOTAL
LOAD	1.169	2.322	N.A.	3.406 GIGA JOULES
SOLAR FRACTION	*	33	N.A.	* PERCENT
SOLAR ENERGY USED	*	0.765	N.A.	* GIGA JOULES
OPERATING ENERGY	0.092	0.195	N.A.	0.699 GIGA JOULES
AUX. THERMAL ENG	1.214	1.290	N.A.	2.504 GIGA JOULES
AUX. ELECTRIC FUEL	1.214	1.384	N.A.	2.598 GIGA JOULES
AUX. FOSSIL FUEL	N.A.	N.A.	N.A.	N.A. GIGA JOULES
ELECTRICAL SAVINGS	*	0.348	N.A.	* GIGA JOULES
FOSSIL SAVINGS	N.A.	N.A.	N.A.	N.A. GIGA JOULES

SYSTEM PERFORMANCE FACTOR: 0.310

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@ DENOTES NULL DATA
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REFERENCE: USER'S GUIDE TO THE MONTHLY PERFORMANCE REPORT OF THE NATIONAL SOLAR DATA PROGRAM,FEBRUARY 28,1978, SOLAR/0004-78/18

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENERGY COLLECTION AND STORAGE SUBSYSTEM (ECSS)

SITE: CHESTER WEST
REPORT PERIOD: MARCH, 1979

SOLAR/1030-79/03

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	AMBIENT TEMP DEG-F	ENERGY TO LOADS MILLION BTU	AUX THERMAL TO ECSS MILLION BTU	ECSS OPERATING ENERGY MILLION BTU	ECSS ENERGY REJECTED MILLION BTU	ECSS SOLAR CONVERSION EFFICIENCY
1	0.298	52	*	N	0.000	N	*
2	0.415	57	*	O	0.014	O	*
3	0.017	60	*	T	0.000	T	*
4	0.301	56	*		0.014		*
5	0.350	39	*	A	0.013	A	*
6	0.536	43	*	P	0.016	P	*
7	*	*	*	P	*	P	*
8	*	*	*	L	*	L	*
9	0.492	50	*	I	0.026	I	*
10	0.017	46	*	C	0.041	C	*
11	0.522	37	*	A	0.029	A	*
12	0.507	50	*	B	0.016	B	*
13	0.208	61	*	L	0.009	L	*
14	0.469	53	*	E	0.014	E	*
15	0.517	41	*		0.014		*
16	0.369	47	*		0.013		*
17	0.441	59	*		0.015		*
18	0.355	64	*		0.015		*
19	0.297	63	*		0.011		*
20	0.301	63	*		0.011		*
21	0.256	67	*		0.025		*
22	0.131	65	*		0.008		*
23	0.281	59	*		0.008		*
24	0.066	43	*		0.000		*
25	0.058	34	*		0.001		*
26	0.508	43	*		0.016		*
27	0.117	53	*		0.007		*
28	0.433	66	*		0.015		*
29	0.276	70	*		0.013		*
30	0.249	70	*		0.012		*
31	0.063	67	*		0.001		*
SUM	9.461	-	*	N.A.	0.400	N.A.	-
AVG	0.305	54	*	N.A.	0.013	N.A.	*
NBS ID	Q001	N113			Q102		N111

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
COLLECTOR ARRAY PERFORMANCE

SITE: CHESTER WEST
REPORT PERIOD: MARCH,1979

SOLAR/1030-79/03

DAY OF MONTH	INCIDENT SOLAR ENERGY MILLION BTU	OPERATIONAL INCIDENT ENERGY MILLION BTU	COLLECTED SOLAR ENERGY MILLION BTU	DAYTIME AMBIENT TEMP DEG F	COLLECTOR ARRAY EFFICIENCY
1	0.298	0.003	0.000	58	0.000
2	0.415	0.401	0.297	64	0.716
3	0.017	0.000	0.000	59	0.000
4	0.301	0.296	0.157	63	0.521
5	0.350	0.307	0.158	44	0.452
6	0.536	0.507	0.275	52	0.513
7	*	*	*	*	*
8	*	*	*	*	*
9	0.492	0.469	0.196	55	0.399
10	0.017	0.017	-0.114	47	-6.569
11	0.522	0.521	0.249	41	0.476
12	0.507	0.481	0.270	61	0.532
13	0.208	0.173	0.066	68	0.319
14	0.469	0.440	0.193	56	0.411
15	0.517	0.471	0.203	47	0.393
16	0.369	0.328	0.166	53	0.451
17	0.441	0.412	0.212	66	0.480
18	0.355	0.323	0.128	72	0.360
19	0.297	0.260	0.105	75	0.355
20	0.301	0.259	0.098	74	0.326
21	0.256	0.219	-0.018	74	-0.069
22	0.131	0.080	0.012	70	0.098
23	0.281	0.252	0.120	65	0.428
24	0.066	0.000	0.000	*	0.000
25	0.058	0.005	0.004	34	0.074
26	0.508	0.482	0.260	50	0.511
27	0.117	0.056	0.012	58	0.100
28	0.433	0.409	0.228	73	0.526
29	0.276	0.254	0.116	73	0.420
30	0.249	0.223	0.103	72	0.414
31	0.063	0.008	0.003	69	0.041
SUM	9.461	8.173	3.740	-	-
AVG	0.305	0.264	0.121	61	0.395
NBSID	Q001		Q100		N100

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
STORAGE PERFORMANCE

SITE: CHESTER WEST
REPORT PERIOD: MARCH,1979

SOLAR/1030-79/03

DAY OF MONTH	ENERGY TO STORAGE MILLION BTU	ENERGY FROM STORAGE MILLION BTU	CHANGE IN STORED ENERGY MILLION BTU	STORAGE AVERAGE TEMP DEG F	STORAGE EFFICIENCY
1	0.000	*	-0.195	68	*
2	0.285	*	0.219	83	*
3	0.000	*	-0.056	97	*
4	0.142	*	0.095	104	*
5	0.140	*	-0.028	109	*
6	0.251	*	0.096	116	*
7	*	*	*	*	*
8	*	*	*	*	*
9	*	*	0.150	114	*
10	*	*	-0.182	101	*
11	*	*	0.111	105	*
12	*	*	0.163	120	*
13	*	*	-0.014	147	*
14	*	*	0.127	162	*
15	*	*	-0.083	170	*
16	*	*	-0.084	128	*
17	*	*	0.046	130	*
18	*	*	0.073	156	*
19	*	*	0.029	171	*
20	*	*	0.019	175	*
21	*	*	-0.113	173	*
22	*	*	-0.016	147	*
23	*	*	0.085	157	*
24	*	*	-0.298	139	*
25	*	*	-0.039	82	*
26	*	*	0.247	116	*
27	*	*	-0.131	129	*
28	*	*	0.077	119	*
29	*	*	-0.007	130	*
30	*	*	-0.011	129	*
31	*	*	-0.064	118	*
SUM	*	*	0.238	-	-
AVG	*	*	0.008	127	*
NBS ID	Q200	Q201	Q202		N108

* DENOTES UNAVAILABLE DATA.
ə DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
HOT WATER SUBSYSTEM

SITE: CHESTER WEST
REPORT PERIOD: MARCH, 1979

SOLAR/1030-79/

DAY OF MON.	HOT WATER LOAD MILLION BTU	SOLAR FR.OF LOAD PER CENT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	SUP. WAT. TEMP DEG F	HOT WAT. TEMP DEG F	HOT WATER USE GAL
1	0.001	*	*	0.000	0.044	0.044	N	*	N	56	115	
2	0.048	*	*	0.006	0.043	0.043	O	*	O	59	150	
3	0.054	*	*	0.011	0.043	0.043	T	*	T	60	146	
4	0.055	*	*	0.010	0.046	0.046		*		60	150	
5	0.014	*	*	0.009	0.014	0.014	A	*	A	63	144	
6	0.026	*	*	0.012	0.021	0.021	P	*	P	64	142	
7	*	*	*	*	*	*	P	*	P	*	*	
8	*	*	*	*	*	*	L	*	L	*	*	
9	*	*	*	0.000	0.060	0.060	I	*	I	*	*	
10	0.008	*	*	0.000	0.019	0.019	C	*	C	73	120	
11	0.013	*	*	0.000	0.021	0.021	A	*	A	62	130	
12	0.002	*	*	0.000	0.010	0.010	B	*	B	72	125	
13	0.099	*	*	0.000	0.117	0.117	L	*	L	64	123	20
14	0.036	*	*	0.000	0.040	0.040	E	*	E	61	135	
15	0.022	*	*	0.000	0.032	0.032		*		61	134	
16	0.093	*	*	0.000	0.090	0.090		*		60	120	14
17	0.008	*	*	0.000	0.014	0.014		*		70	130	
18	0.046	*	*	0.000	0.050	0.050		*		68	120	
19	0.006	*	*	0.000	0.014	0.014		*		64	120	
20	0.025	*	*	0.000	0.030	0.030		*		70	120	
21	0.024	*	*	0.000	0.030	0.030		*		78	131	
22	0.030	*	*	0.000	0.040	0.040		*		72	133	
23	0.024	*	*	0.000	0.029	0.029		*		70	120	
24	0.016	*	*	0.000	0.024	0.024		*		59	120	
25	0.032	*	*	0.000	0.032	0.032		*		56	120	
26	0.084	*	*	0.000	0.094	0.094		*		60	136	1
27	0.013	*	*	0.004	0.020	0.020		*		68	124	
28	0.026	*	*	0.008	0.005	0.005		*		67	125	
29	0.059	*	*	0.009	0.019	0.019		*		67	126	1
30	0.074	*	*	0.008	0.032	0.032		*		66	126	1
31	0.074	*	*	0.006	0.043	0.043		*		67	122	1
SUM	1.108	-	*	0.087	1.151	1.151	N.A.	*	N.A.	-	-	192
AVG	0.036	*	*	0.003	0.037	0.037	N.A.	*	N.A.	65	131	6
NBS	Q302	N300	Q300	Q303	Q301	Q305	Q306	Q311	Q313	N305	N307	N308

* DENOTES UNAVAILABLE DATA.
@ DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
SPACE HEATING SUBSYSTEM

SITE: CHESTER WEST
REPORT PERIOD: MARCH, 1979

SOLAR/1030-79/03

DAY OF MON.	SPACE HEATING LOAD MILLION BTU	SOLAR FR.OF LOAD PCT	SOLAR ENERGY USED MILLION BTU	OPER ENERGY MILLION BTU	AUX THERMAL USED MILLION BTU	AUX ELECT FUEL MILLION BTU	AUX FOSSIL FUEL MILLION BTU	ELECT ENERGY SAVINGS MILLION BTU	FOSSIL ENERGY SAVINGS MILLION BTU	BLDG TEMP DEG. F	AMB TEMP DEG. F
1	0.079	0	0.000	0.004	0.079	0.079	N	0.000	N	70	52
2	0.126	0	0.000	0.006	0.126	0.126	O	0.000	O	73	57
3	0.000	0	0.000	0.000	0.000	0.000	T	0.000	T	72	60
4	0.000	0	0.000	0.000	0.000	0.000		0.000		71	56
5	0.092	84	0.077	0.011	0.015	0.015	A	0.039	A	68	39
6	0.108	26	0.028	0.009	0.081	0.081	P	0.015	P	70	43
7	*	*	*	*	*	*	P	*	P	*	*
8	*	*	*	*	*	*	L	*	L	*	*
9	0.149	2	0.003	0.007	0.146	0.146	I	0.001	I	70	50
10	0.128	25	0.032	0.010	0.096	0.096	C	0.012	C	70	46
11	0.235	21	0.050	0.013	0.185	0.185	A	0.025	A	69	47
12	0.138	35	0.049	0.013	0.089	0.089	B	0.025	R	72	50
13	0.018	56	0.010	0.001	0.008	0.008	L	0.004	L	72	61
14	0.000	0	0.000	0.000	0.000	0.000	E	0.000	E	71	53
15	0.091	93	0.085	0.005	0.007	0.007		0.039		67	41
16	0.103	100	0.103	0.011	0.000	0.000		0.052		69	47
17	0.059	100	0.059	0.007	0.000	0.000		0.023		72	59
18	0.000	0	0.000	0.000	0.000	0.000		0.000		75	64
19	0.000	0	0.000	0.000	0.000	0.000		0.000		76	63
20	0.000	0	0.000	0.000	0.000	0.000		0.000		76	63
21	0.000	0	0.000	0.000	0.000	0.000		0.000		76	67
22	0.000	0	0.000	0.000	0.000	0.000		0.000		75	65
23	0.000	0	0.000	0.000	0.000	0.000		0.000		74	59
24	0.149	72	0.107	0.013	0.036	0.040		0.044		69	43
25	0.359	6	0.020	0.034	0.178	0.232		0.009		70	34
26	0.135	0	0.000	0.012	0.069	0.092		0.000		71	43
27	0.051	31	0.016	0.002	0.029	0.031		0.006		68	53
28	0.039	100	0.039	0.007	0.000	0.000		0.014		73	66
29	0.000	0	0.000	0.000	0.000	0.000		0.000		74	70
30	0.000	0	0.000	0.000	0.000	0.000		0.000		74	70
31	0.000	0	0.000	0.000	0.000	0.000		0.000		73	67
SUM	2.201	-	0.725	0.176	1.223	1.312	N.A.	0.330	N.A.	-	-
AVG	0.071	33	0.023	0.006	0.039	0.042	N.A.	0.011	N.A.	72	54
NBS	Q402	N400	Q400	Q403	Q401		Q410	Q415	Q417	N406	N113

* DENOTES UNAVAILABLE DATA.
Ø DENOTES NULL DATA.
N.A. DENOTES NOT APPLICABLE DATA.

SOLAR HEATING AND COOLING DEMONSTRATION PROGRAM

MONTHLY REPORT
ENVIRONMENTAL SUMMARY

SITE: CHESTER WEST
REPORT PERIOD: MARCH, 1979

SOLAR/1030-79/03

DAY OF MONTH	TOTAL INSOLATION BTU/SQ.FT	DIFFUSE INSOLATION BTU/SQ.FT	AMBIENT TEMPERATURE DEG F	DAYTIME AMBIENT TEMP DEG F	RELATIVE HUMIDITY PERCENT	WIND DIRECTION DEGREES	WIND SPEED M.P.H.
1	1326	N	52	58	N	N	N
2	1843	O	57	64	O	O	O
3	77	T	60	59	T	T	T
4	1339		56	63			
5	1554	A	36	44	A	A	A
6	2381	P	43	52	P	P	P
7	*	P	*	*	P	P	P
8	*	L	*	*	L	L	L
9	2186	I	50	55	I	I	I
10	77	C	46	47	C	C	C
11	2322	A	37	41	A	A	A
12	2255	B	50	61	B	B	B
13	926	L	61	68	L	L	L
14	2085	E	53	56	E	E	E
15	2297		41	47			
16	1638		47	53			
17	1960		59	66			
18	1578		64	72			
19	1321		63	75			
20	1337		63	74			
21	1136		67	74			
22	583		65	70			
23	1249		59	65			
24	291		43	*			
25	259		34	34			
26	2257		43	50			
27	519		53	59			
28	1923		66	73			
29	1228		70	73			
30	1109		70	72			
31	281		67	69			
SUM	42049	N.A.	-	-	-	-	-
AVG	1356	N.A.	54	61	N.A.	N.A.	N.A.
NBS ID	0001		N113			N115	N114

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a DENOTES NULL DATA.
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